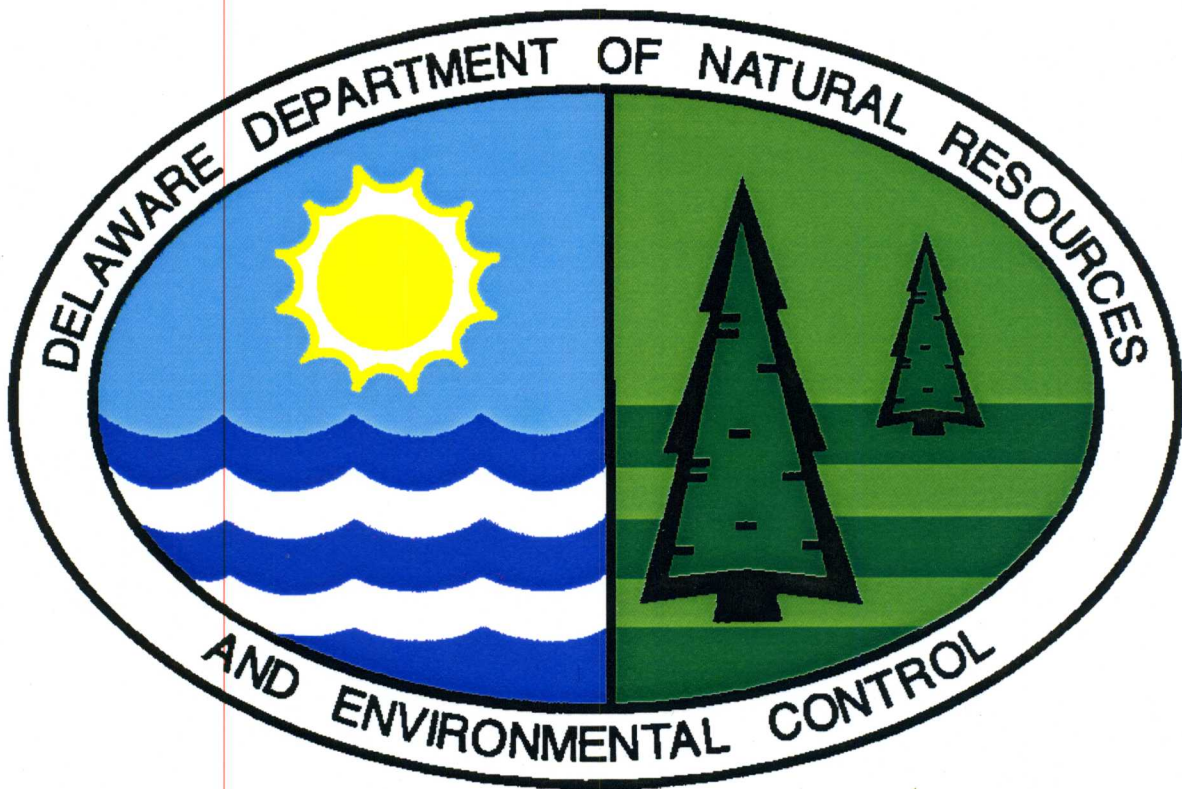


# FINAL PLAN OF REMEDIAL ACTION

Petrillo Property Site  
New Castle, Delaware

DNREC Project No. DE-1281



October 2003

Department of Natural Resources and Environmental Control  
Division of Air and Waste Management  
Site Investigation and Restoration Branch

SCANNED

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## **1.0 INTRODUCTION**

The Petrillo Property (site) is located along Grantham Lane, approximately one-half mile west of Rt. 9 in New Castle, Delaware (Figure 1). The site is a 29.56 acre parcel known as New Castle County tax parcel number 10-035.00-005 (Figure 2). The site is bounded by Grantham Lane to the northeast, a residential neighborhood to the southeast, woods and some industrial buildings to the east, and the Army Creek Landfill and Delaware Sand and Gravel Landfill to the west and northwest, respectively. The site was identified by the Delaware Department of Natural Resources and Environmental Control (DNREC or Department) Site Investigation and Restoration Branch (SIRB) after a Phase I Environmental Site Assessment report was submitted to DNREC on March 11, 2002 by WIK Associates, Inc. (WIK).

This document is the Department's final plan of remedial action (final plan) for the site. It is based on the results of the previous investigations performed at the site. This final plan is issued under the provisions of the Delaware Hazardous Substances Cleanup Act (HSCA) and the Regulations Governing Hazardous Substance Cleanup (Regulations). It presents the Department's assessment of the potential health and environmental risks posed by the site.

As described in Section 12 of the Regulations, DNREC has provided notice to the public and an opportunity for the public to comment on the proposed plan. DNREC did not receive comments; therefore DNREC has adapted the proposed plan as the final plan. The final plan designates the selected remedy for the site. All prior investigations of the site, the proposed plan, and the final plan constitute the Remedial Decision Record.

Section 2 presents a summary of the site description, site history and previous investigations of the site. Section 3 provides a description of the remedial investigation results. Section 4 presents a discussion of the remedial objectives. Section 5 presents the final plan of remedial action. Section 6 discusses public participation requirements. Section 7 discusses that the final plan is protective of human health and is consistent with the HSCA Rules and Regulations.

## **2.0 SITE DESCRIPTION AND HISTORY**

### **2.1 DESCRIPTION**

The Site (DE-1281) is located on 758 Grantham Lane, New Castle, Delaware, 19720. It is owned by the Petrillo Brothers, Inc. and is zoned as industrial. No utilities are supplied to the site at this time. The prospective purchasers, Cirillo Brothers, intend to construct a warehousing facility on the southeast portion of the site.

### **2.2 HISTORY**

The historical use of this site was investigated, through a review of historical maps and by conducting interviews. Based on the historical map review detailed in WIK's Phase I Environmental Site Assessment (ESA), past and present interviews with owners, and aerial photographs, the site has been maintained as wooded land.

On March 11, 2002, WIK submitted to DNREC, on behalf of the Cirillo Brothers, the Phase I ESA. The purpose of the ESA was to identify existing and potential releases of hazardous substances on the site. On October 18, 2002, the Cirillo Brothers, requested to enter into a Voluntary Cleanup Program (VCP) Agreement with DNREC-SIRB. During the review process of the draft VCP Agreement, the Cirillo Brothers decided to withdraw their application.

On November 20, 2002, WIK submitted to DNREC a letter summarizing the proposed scope of work for the site. The proposed scope of work included reviewing and summarizing existing data from the adjacent sites, as well as groundwater monitoring data from the site. No sampling of soil or groundwater was proposed to be conducted in this letter.

In December 2002, the Cirillo Brothers replaced WIK with Ten Bears Environmental (TBE) as their consultant. Representatives from TBE met with DNREC on February 3, 2003 to discuss future actions and sampling requirements for the site. During this meeting, DNREC suggested the use of Visual Sampling Plan (VSP) software to determine the number of soil samples to be collected at the site. Sample locations were chosen in the area where construction activities were planned.

### **3.0 INVESTIGATION RESULTS**

#### **3.1 SOIL**

TBE conducted soil sampling on February 12, 2003, and sent a total of 28 soil samples to DNREC for laboratory screening. All the soil samples collected from the site were screened by DNREC-SIRB for volatile organic compounds (VOCs), total polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and selected metals. The screening results indicated that no VOCs, PAHs, or PCBs were detected in the samples. The screening results also indicated that concentrations of several metals such as vanadium, manganese, iron, cadmium, antimony, and barium were above the DNREC's Uniform Risk-Based Standards (URS) unrestricted use (i.e., residential) values for a non-critical water resource area, but were below the restricted use (i.e., commercial) URS values for a non-critical water resource area.

The X-Ray Fluorescence (XRF) soil inorganic sampling results are summarized in Table 2. This table compares the highest concentration of contaminants that were found above the unrestricted URS values, as well as the mean concentrations for contaminants detected above unrestricted URS values typical concentrations found to naturally occur in Delaware soils, as well as unrestricted URS values, and restricted URS values.

Five of the total 28 samples were randomly selected and sent to Lancaster Laboratories, Inc. (LLI) for analysis for target compound list (TCL) VOCs, TCL semivolatile organic compounds (SVOCs), TCL pesticides/PCBs, and target analyte list (TAL) metals. Of these confirmatory samples, five (5) aluminum, five (5) iron, and two (2) manganese results exceeded the unrestricted (residential) URS values for a non-critical water resource area, but none of the soil results exceeded the restricted (commercial) URS values for a non-critical water resource area. A summary of the laboratory inorganic soil results is shown in Table 3. A summary of the laboratory organic soil results is shown in Table 4.

The metal concentrations found in soil analyzed by the LLI were lower than the respective metal concentrations analyzed by XRF in Tables 5, 6, and 7. Based on the LLI results, a conversion factor was used to adjust the XRF screening metal results. The adjusted values are presented in Table 8. After the screening data was adjusted, only vanadium was found to be above the unrestricted URS value in a non-critical water resource area, however, this result was below the restricted URS value in a non-critical water resource area.

### **3.2 GROUNDWATER**

The groundwater data obtained from the adjacent property (Army Creek Landfill files) showed that there were contaminants that exceeded their respective groundwater URS values. It is DNREC's understanding that three groundwater monitoring wells for the Army Creek Landfill (MW-10S, C6, and P6) are located on the Petrillo site. MW-10S is located just a few yards west of the soil sampling location of S26, and monitoring wells, C6 and P6, are located just a few yards west of the sampling location of S24 (Figure 4).

The three monitoring wells have been sampled quarterly as part of the Army Creek Landfill's operation and maintenance (O & M) plan. The sampling results from monitoring well P6 has shown bis(2-chloroethyl)ether (BCEE) concentration of 97 ug/L, which is above the URS value for groundwater in Delaware (Table 1). Monitoring wells MW-10S and C6 did not contain concentrations of BCEE or other contaminants above the groundwater URS values.

### **3.3 SUMMARY**

The results of the soil investigations indicate that the site contained one contaminant, vanadium, at a level exceeding the URS value for unrestricted use. Specifically, vanadium exceeded the unrestricted URS values for surface and subsurface soil, but was below the restricted URS value for a non-critical water resource area. Aluminum, iron, and manganese concentrations also exceeded the unrestricted URS values for surface and subsurface soil, but were below the restricted URS value for a non-critical water resource area. However, the mean concentrations of aluminum, iron, and manganese were well within the typical soil background concentrations for Delaware and do not present an increased risk to human health and the environment. The groundwater contained BCEE at a concentration that exceeded the URS value for groundwater.

### **3.4 RISK EVALUATION**

DNREC used the site specific risk calculator using the highest value to calculate the risk of the vanadium concentration of 149 milligram per kilogram (mg/kg). The non-carcinogenic risk for this metal was calculated resulting in a Hazard Index (HI) of 0.27. DNREC uses a HI of 1.00 or less for unrestricted use as an acceptable risk level. Since the vanadium HI was calculated to be 0.27 risk and this is less than the DNREC's acceptable risk level of a HI of 1.00 for unrestricted use, the soils at this site do not pose a risk to human health and the environment. Therefore, no further action is required for soils at this site.

Groundwater at the site contains elevated levels of BCEE. The BCEE contaminant concentration levels were found to be higher than the groundwater URS value. The site specific risk calculator was used to determine the risk associated with the BCEE. The result of the calculation was 3.73

$1 \times 10^{-4}$  (Table 11). This result is higher than the  $1 \times 10^{-5}$  carcinogenic risk considered acceptable pursuant to the Regulations.

## **4.0 REMEDIAL ACTION OBJECTIVES**

According to Section 8.4 (1) of the Regulations, site-specific Remedial Action Objectives (RAOs) must be established for all plans of remedial action. The Regulations require that DNREC set objectives for land use, resource use, and cleanup levels that are protective of human health and the environment.

### **4.1 QUALITATIVE OBJECTIVES**

Qualitative objectives describe, in general terms, what the ultimate result of the remedial action, if necessary, should be. The following qualitative objectives are determined to be appropriate for the site:

- Prevent residential exposure to impacted soil and groundwater;
- Minimize potential exposure to site contaminants of concern for workers at the site; and
- Prevent environmental degradation due to impacted soil and groundwater.

These objectives are consistent with the New Castle County zoning policies, state regulations governing water supply, worker health and safety, and HSCA.

### **4.2 QUANTITATIVE OBJECTIVES**

Quantitative objectives define specific levels of remedial action to achieve protection of human health and the environment. Based on the qualitative objectives, the quantitative objectives will be used to ensure that future site users such as site workers (employees), visitors, and trespassers do not come in contact with soils and groundwater that contain elevated levels of aluminum, iron, manganese, vanadium, and BCEE above the established unrestricted URS values.

Based on the qualitative objectives, the quantitative objective is:

- Prevent human exposure to groundwater contaminated with BCEE that would result in a carcinogenic risk exceeding  $1 \times 10^{-5}$ .

## **5.0 FINAL PLAN OF REMEDIAL ACTION**

DNREC is proposing that the remedial objectives at this site will be satisfied through the implementation of the following remedial action:

- The property owner will place a deed restriction on the site, which will prohibit the installation of any water wells on, or groundwater usage at the site without prior written approval of DNREC, and note that the site is located within groundwater management zone (GMZ), which is an internal DNREC document that restricts groundwater withdrawals at the site.

- DNREC will include the site in the GMZ for the Army Creek Landfill and Delaware Sand and Gravel Superfund sites.

## 6.0 PUBLIC PARTICIPATION

The Department actively solicited public comments or suggestions on the proposed plan of remedial action. The public comment period began on, August 31, 2003, and ended at the close of business September 24, 2003. No comments were received during the public comment period.

## 7.0 DECLARATION

This final plan of remedial action for the Petrillo Property site is protective of human health, welfare, and the environment and is consistent with the requirements of the Delaware Hazardous Substance Cleanup Act.

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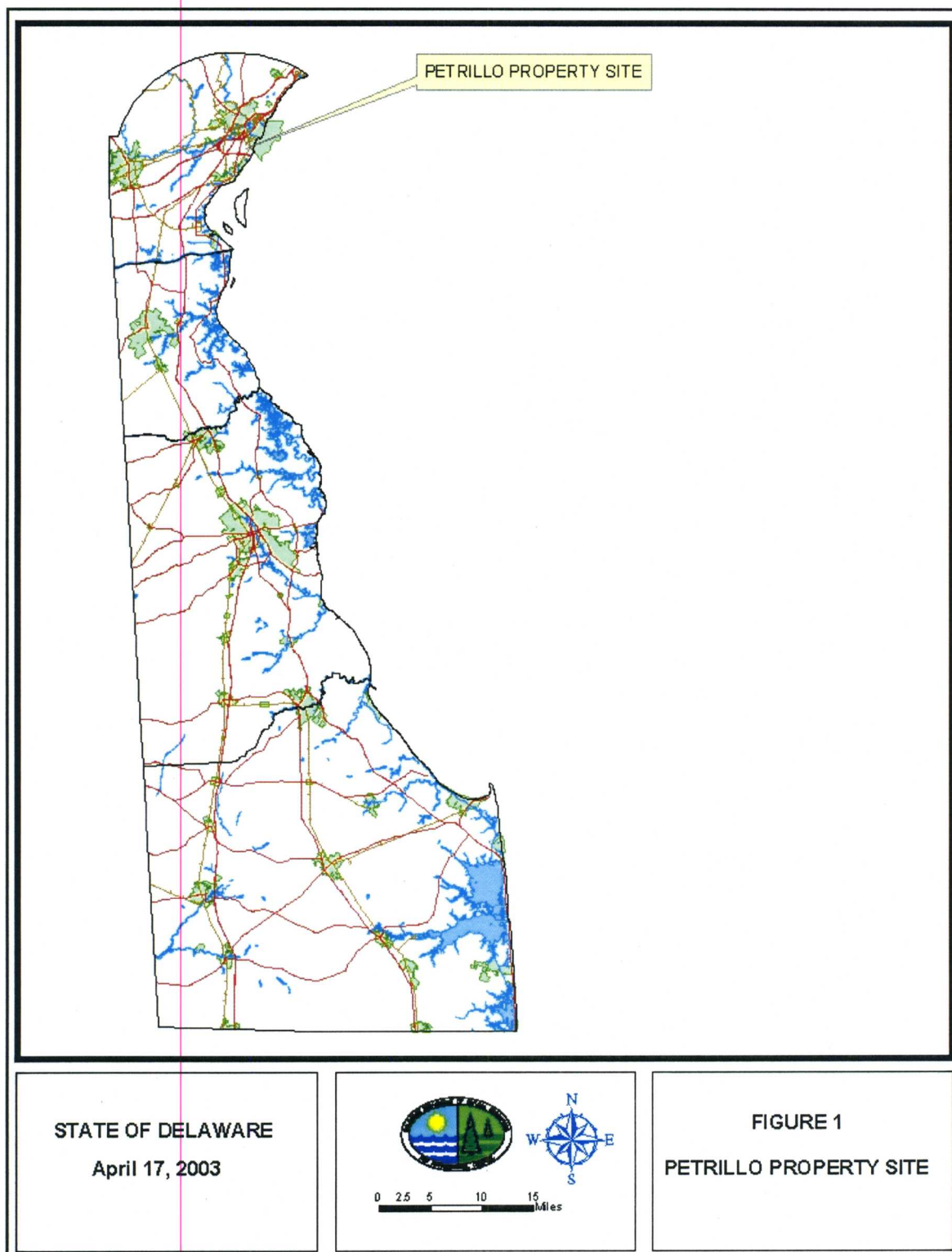


John Blevins, Director, DAWM

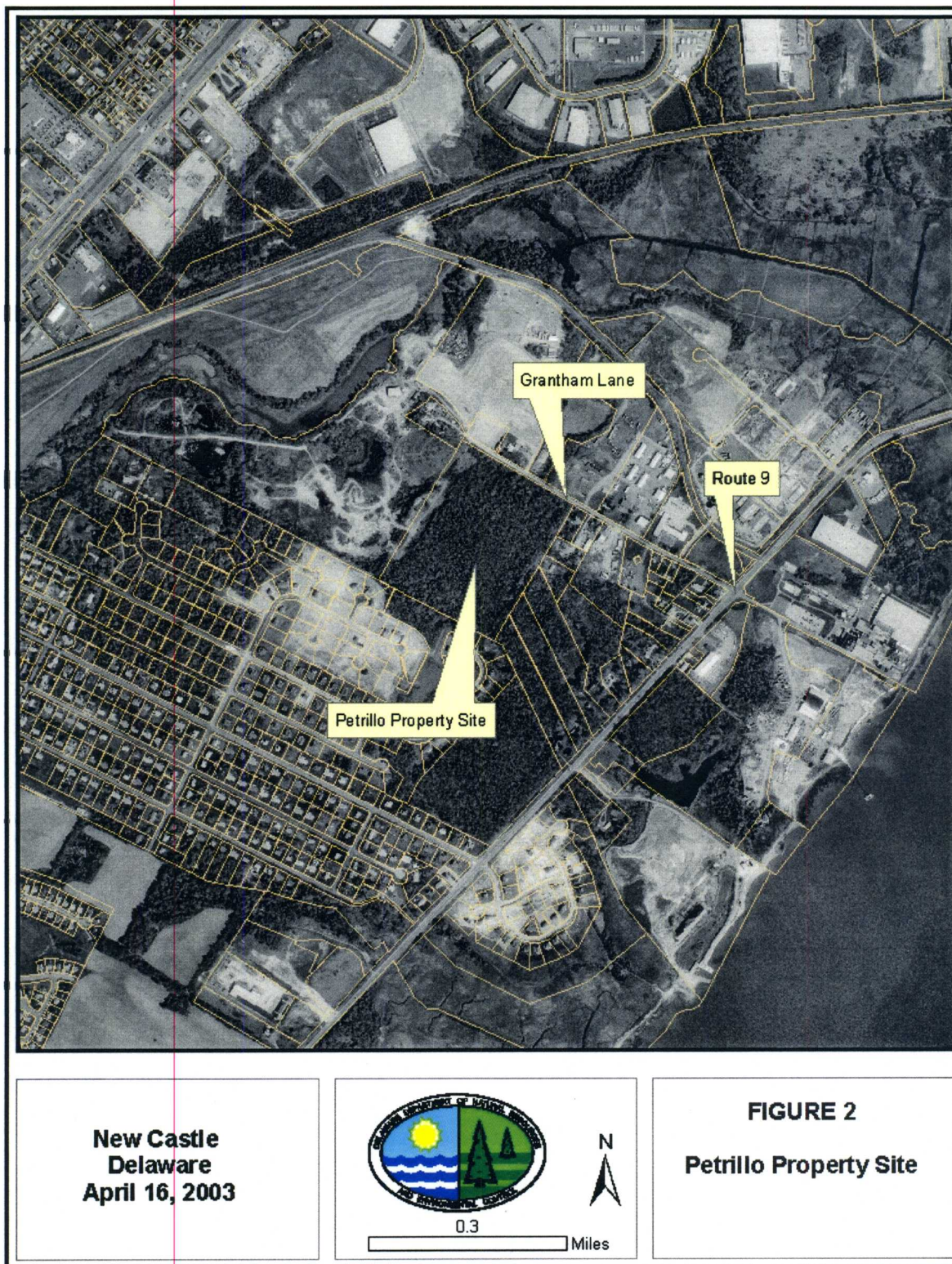
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Date

Figure 1: Site Location



**Figure 2: Aerial of Site**



**Figure 3: Site Parcel**

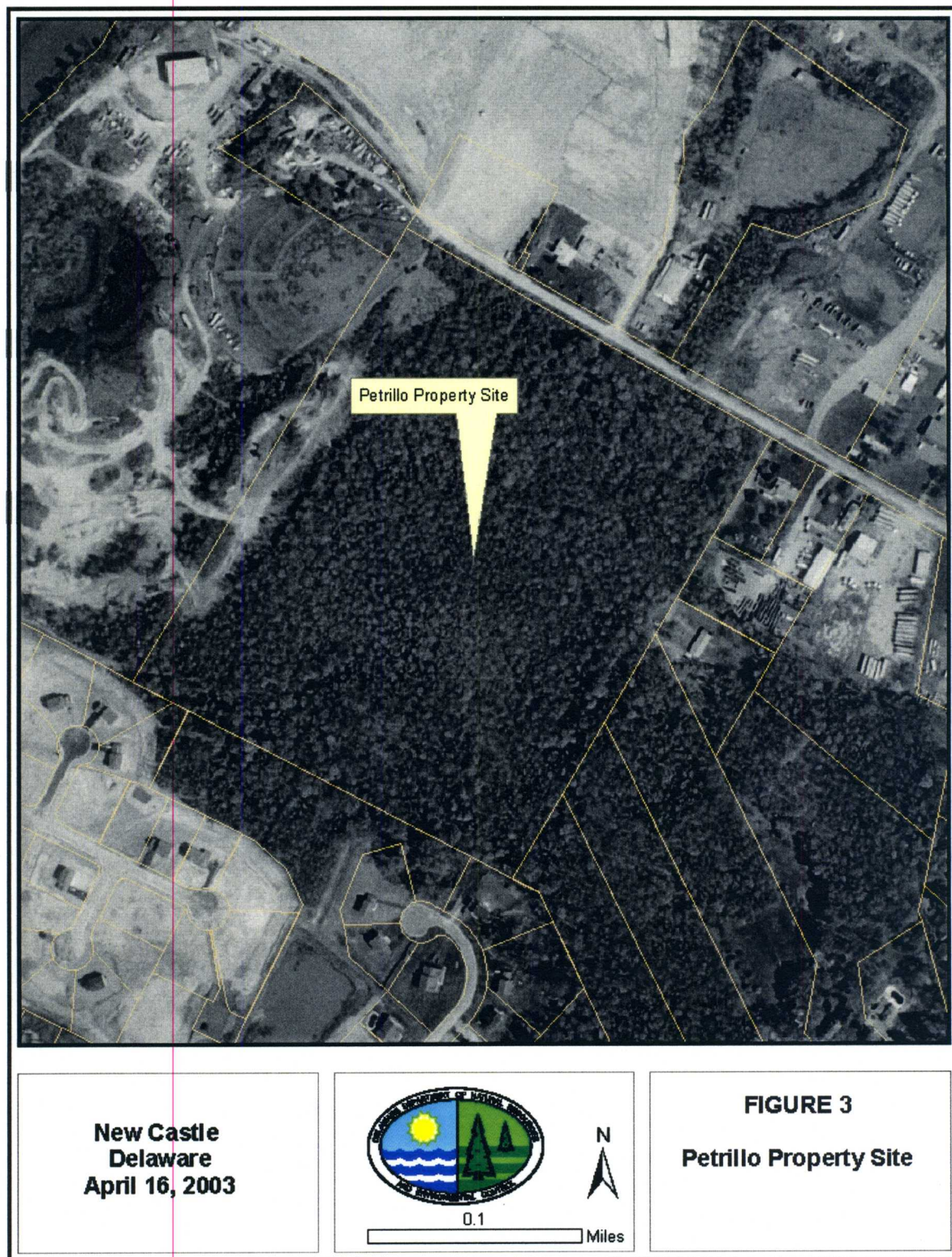



FIGURE 4: Soil Sample Location



 <b>Ten Bears Environmental</b>  Ten Bears Environmental, L.L.C. 41 C Blue Hen Drive Newark, DE 19713 Phone: (302) 731-8633 Fax: (302) 731-8655	<b>FIGURE 2 - SAMPLE LOCATION SKETCH</b> <b>FORMER PETRILLO PROPERTY</b> GRANTHAM LANE CITY OF NEW CASTLE, NEW CASTLE COUNTY, DELAWARE	
	DATE: 10 March 2003	JOB NUMBER: 02-77.A
	DRAWN BY: JPG	SCALE: NOT TO SCALE
	CHECKED BY:	FIGURE NO: 1
	FILE NO: 02-77.A-fig	SHEET 1 OF 1

**Table 1: Army Creek Landfill Boundary Well Sampling Results.**

**ARMY CREEK LANDFILL BOUNDARY WELL SAMPLING RESULTS**

PETRILLO PROPERTY  
NEW CASTLE, DELAWARE

Well Identification	URS for	BW-1	BW-2	MW-10	MW-11	MW-34
Matrix	Groundwater	Water	Water	Water	Water	Water
Units	(µg/l)	µg/l	µg/l	µg/l	µg/l	µg/l
<b>JULY 2002 RESULTS</b>						
Bis(2-chloroethyl)ether	<b>0.01</b>	<b>40</b>	<b>34</b>	<b>NT</b>	<b>NT</b>	<b>140</b>
<b>APRIL 2002 RESULTS</b>						
Bis(2-chloroethyl)ether	<b>0.01</b>	<b>21</b>	<b>30</b>	<b>NT</b>	<b>NT</b>	<b>74</b>
<b>JANUARY &amp; FEBRUARY 2002 RESULTS</b>						
Bis(2-chloroethyl)ether	<b>0.01</b>	<b>28</b>	<b>25</b>	<b>NT</b>	<b>NT</b>	<b>80</b>

Well Identification	URS for	RT1UP	C-6	P-6	P5U	P5L
Matrix	Groundwater	Water	Water	Water	Water	Water
Units	(µg/l)	µg/l	µg/l	µg/l	µg/l	µg/l
<b>JULY 2002 RESULTS</b>						
Bis(2-chloroethyl)ether	<b>0.01</b>	<b>0.22</b>	<b>Dry</b>	<b>97</b>	<b>13</b>	<b>6.3</b>
<b>APRIL 2002 RESULTS</b>						
Bis(2-chloroethyl)ether	<b>0.01</b>	<b>0.069</b>	<b>Dry</b>	<b>39</b>	<b>19</b>	<b>4.5</b>
<b>JANUARY &amp; FEBRUARY 2002 RESULTS</b>						
Bis(2-chloroethyl)ether	<b>0.01</b>	<b>3.7</b>	<b>Dry</b>	<b>89</b>	<b>11</b>	<b>89</b>

- NOTES:
1. µg/L = micrograms per liter
  2. URS = Uniform Risk-Based Remediation Standards, published in the December 1999 State of Delaware Department of Natural Resources and Environmental Control, Site Investigation and Restoration Branch (DNREC-SIRB) document entitled, "Remediation Standards Guidance Under the Delaware Hazardous Substance Cleanup Act."
  3. This table is part of Ten Bears' March 10, 2003 letter to Mr. Adel Abumohor and should be viewed in that context.

**Table 2: Results of XRF Values**

**Results of XRF Values**

Contaminant	Highest Concentration (mg/kg)	Mean of Detected Results (mg/kg)	Typical Delaware Soil Concentration (mg/kg)	Unrestricted URS (mg/kg)	Restricted URS (mg/kg)
Antimony	65	25.8	<0.5	3	82
Barium	773	373	40-80	550	14,000
Cadmium	22	9.9	1-3	4	100
Iron	22,683	15,748	3,000-22,000	2,300	61,000
Manganese	806	131	60-350	160	4,100
Vanadium	119	76	15-40	55	1,400

**Table 3: Summary of Soil Sample Laboratory Analytical Results (Inorganic)**

**SUMMARY OF SOILS SAMPLE LABORATORY ANALYSIS RESULTS  
INORGANICS**

**PETRILLO PROPERTY  
NEW CASTLE, DELAWARE**

Location Identification	Typical Delaware Soil Concentrations (mg/kg)	URS for Unrestricted Use, Non- critical Water Resource Area (mg/kg)	URS for Restricted Use, Non- critical Water Resource Area (mg/kg)	S-3	S-6	S-10	S-14	S-17
Laboratory I.D.				SW3999172	SW3999173	SW3999174	SW3999175	SW3999176
Sample Depth (feet)				0-2	0-2	0-2	0-2	0-2
Sampling Date (mo/d/yr)				2/12/2003	2/12/2003	2/12/2003	2/12/2003	2/12/2003
Matrix				Soil	Soil	Soil	Soil	Soil
Sample Type				Grab	Grab	Grab	Grab	Grab
Units				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Moisture (percent)				20	20.1	20.1	23.8	21.5
<b>TAL METALS</b>								
Aluminum	4,800 - 12,000	7,800	200,000	22,900	19,400	19,900	19,500	22,100
Antimony	<0.5	3	62	ND	ND	ND	ND	ND
Arsenic	1 - 10	11	11	4.8	4.1	5.1	4.1	5.7
Barium	40 - 80	550	14,000	54.1	79.2	49.7	94	64
Beryllium	0.6 - 1.0	16	410	0.71	0.8	0.52 J	0.92	0.63 J
Cadmium	1 - 3	4	100	0.2 J	0.12 J	0.15 J	ND	0.12 J
Calcium	NL	NL	NL	548	390	425	489	432
Chromium	5 - 30	270**	610**	32	23.3	30	23.8	31.2
Cobalt	4 - 13	470	12,000	6.4	4.8 J	5 J	6.9	5.8 J
Copper	15 - 40	310	8,200	10.8	6.4	8.7	7.3	9.2
Iron	3,000 - 22,000	2,300	61,000	24,500	16,800	23,300	18,600	25,400
Lead	30 - 100	400	1,000	14.5	13	11	13.1	11.4
Magnesium	NL	NL	NL	2,970	1,670	2,270	2,010	2,450
Manganese	60 - 350	160	4,100	135	163	114	469	113
Mercury	0.1 - 0.3	10	610	ND	0.02 J	0.014 J	0.038 J	0.026 J
Nickel	5 - 15	160	4,100	13.9	11.8	11.5	12.4	12.3
Potassium	NL	NL	NL	1,420	860	1,050	929	1,210
Selenium	0.1 - 0.5	39	1,000	ND	ND	ND	ND	ND
Silver	1 - 2	39	1,000	0.16 J	ND	ND	ND	0.32 J
Sodium	NL	NL	NL	ND	ND	ND	ND	ND
Thallium	1	18	220	3.7	2.7	3.5	3.4	3.8
Vanadium	15 - 40	55	1,400	47.1	34.7	42.4	35	44.7
Zinc	60 - 90	2,300	61,000	38.8	37.3	35.7	42.4	39.1
Total Cyanide	PQL	160***	4100***	ND	ND	ND	ND	ND

**NOTES:**

1. mg/kg = milligrams per kilogram
2. URS = Uniform Risk-Based Remediation Standards, published in the December 1999 State of Delaware Department of Natural Resources and Environmental Control, Site Investigation and Restoration Branch (DNREC-SIRB) document entitled, "Remediation Standards Guidance Under the Delaware Hazardous Substance Cleanup Act."
3. **16,800** Bold value indicates results exceed URS for Unrestricted Use.
4. NL = Not Listed
5. NA = Not Applicable
6. TICs = Tentatively Identified Compounds.
7. PQL = practical quantitation limit
8. This table is part of Ten Bears' March 10, 2003 letter to Mr. Adel Abumohor and should be viewed in that context.
- \*\* Standards shown are for Chromium VI.
- \*\*\* Standards shown are for "free cyanide."

**Table 4: Summary of Soil Sample Laboratory Analytical Results (Organic)**

**SUMMARY OF SOILS SAMPLE LABORATORY ANALYSIS RESULTS  
ORGANICS**

PETRILLO PROPERTY  
NEW CASTLE, DELAWARE

Location Identification	URS for	URS for	S-3	S-6	S-10	S-14	S-17
Laboratory I.D.	Unrestricted	Restricted	SW3999172	SW3999173	SW3999174	SW3999175	SW3999176
Sample Depth (feet)	Use, Non-	Use, Non-	0-2	0-2	0-2	0-2	0-2
Sampling Date (mo/d/yr)	critical Water	critical Water	2/12/2003	2/12/2003	2/12/2003	2/12/2003	2/12/2003
Matrix	Resource	Resource	Soil	Soil	Soil	Soil	Soil
Sample Type	Area (mg/kg)	Area (mg/kg)	Grab	Grab	Grab	Grab	Grab
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Moisture (percent)			20	20.1	20.1	23.8	21.5
<b>TCL PESTICIDES / POLYCHLORINATED BIPHENYLS (PCBs)</b>							
Delta-BHC	NL	NL	ND	ND	ND	0.00043 J	0.00024 J
Gamma-Chlordane	2	16	0.0003 J	0.0004 J	0.00035 J	ND	0.00043 J
Alpha BHC	2	16	0.00038 J	ND	ND	0.00039 J	ND
p,p'-DDE	2	17	ND	0.00049 J	ND	0.00056 J	ND
Endrin Ketone	NL	NL	ND	0.0019 J	ND	ND	ND
<b>TCL SEMIVOLATILE COMPOUNDS</b>							
None Detected	NA	NA					
Total Estimated TICs	NL	NL	34.12 J	50.72 J	24.71 J	29.04 J	25.2 J
<b>TCL VOLATILE COMPOUNDS</b>							
None Detected	NA	NA					
Total Estimated TICs	NL	NL	ND	2.95 J	ND	ND	ND

- NOTES:
1. mg/kg = milligrams per kilogram
  2. URS = Uniform Risk-Based Remediation Standards, published in the December 1999 State of Delaware Department of Natural Resources and Environmental Control, Site Investigation and Restoration Branch (DNREC-SIRB) document entitled, "Remediation Standards Guidance Under the Delaware Hazardous Substance Cleanup Act."
  3. **16,800** Bold value indicates results exceed URS for Unrestricted Use.
  4. NL = Not Listed
  5. NA = Not Applicable
  6. TICs = Tentatively Identified Compounds.
  7. J = Estimated concentration.
  8. This table is part of Ten Bears' March 10, 2003 letter to Mr Adel Abumohor and should be viewed in that context.
- .. Standards shown are for Chromium VI.
- ... Standards shown are for "free cyanide."

Table 5: Laboratory results for the five samples

Sample #	1	6	10	14	17	LAB MEAN
Antimony	LAB	LAB	LAB	LAB	LAB	
Barium	0	0	0	0	0	0
Cadmium	54.1	79.2	49.7	94	68.2	69.04
vanadium	0.2	0.12	0.15	0	0.12	0.118
	47.1	34.7	42.4	35	44.7	40.78

Table 6: XRF-results for the five

Sample #	1	6	10	14	17	XFR MEAN
Antimony	XRF	XRF	XRF	XRF	XRF	
Barium	47.51	13.7	0	0	32.3	18.702
Cadmium	324.4	463.8	85.5	395	83.1	270.36
vanadium	21.5	22.1	17.2	0	5.1	13.18
	84.7	119.4	82.9	97.4	85.9	94.06

Table 7: Comparing lab results for XRF results for each of the five samples

Sample #	1	6	10	14	17	XRF MEAN
Antimony	Lab - XRF	Lab - XRF	Lab - XRF	Lab - XRF	Lab - XRF	
Barium	0 - 47.51	0 - 13.7	0 - 0	0 - 0	0 - 32.3	25.8
Cadmium	54.1 - 324.4	79.2 - 463.8	49.7 - 85.5	94 - 395	68.2 - 83.1	373
vanadium	0.2 - 21.5	0.12 - 22.1	0.15 - 17.2	0 - 0	0.12 - 5.1	9.9
	47.1 - 84.7	34.7 - 119.4	42.4 - 82.9	35 - 97.4	44.7 - 85.9	76

Table 8: Comparing Laboratory mean to XRF mean results for the five metals

	LAB MEAN	XFR MEAN	LAB/XFR (Conversion factor)	Highest XRF form all the samples	Converted	Unrestricted URS
Antimony	0	18.7	0	65	0	3
Barium	69	270.3	0.25527192	773	197.3251942	550
Cadmium	0.12	13.2	0.009090909	22	0.2	4
Vanadium	70.8	94.1	0.752391073	199	149.7258236	55

**Table 9: Soil risk evaluation in an unrestricted use area (Residential)**

Command Buttons			DNREC SITE-SPECIFIC STANDARD CALCULATOR FOR MULTIPLE ANALYTES May, 1999 Version				Calculated Cancer Risk			Calculated Noncancer Risk				
<div>Click to learn about this application</div> <div>Click here to calculate risk</div> <div>Click on this to filter results</div> <div>Click to remove results filter</div>			Site Concentrations Table				Totals By Category			Totals By Category				
			CAS Number	Ground Water Concentration ug/L	Soil Concentration (Restricted Use) mg/kg	Soil Concentration (Unrestricted Use) mg/kg	Ground Water Ingestion Cancer Risk	Soil-Related Cancer Risk (Restricted Use)	Soil-Related Cancer Risk (Unrestricted Use)	Maximum in Each Category	0.00E+00	0.00E+00	Maximum in Each Category	0.00
Contaminant Name														
METALS														
ALUMINUM	7429905													
ANTIMONY	7440360													
ANTIMONY TETROXIDE	1332816													
ARSENIC	7440382													
BARIUM	7440393													
BERYLLIUM	7440417													
CADMIUM-WATER	7440439													
**CHROMIUM III	16065831													
**CHROMIUM VI	18540299													
COBALT	7440484													
COPPER	7440508													
IRON	7439896													
LEAD										No Risk Calculated for this Analyte	No Risk Calculated for this Analyte			
MANGANESE	7439965													
MERCURY (INORGANIC)	7439976													
NICKEL	7440020													
SELENIUM	7782492													
SILVER	7440224													
THALLIUM	7440280													
TITANIUM	7440326													
TITANIUM DIOXIDE	13463677													
URANIUM (SOLUBLE SALTS)														
VANADIUM	7440622													
VANADIUM SULFATE	16785812													0.27
ZINC	7440666													
CYANIDES														

Table 10: Soil risk evaluation in a restricted use area (Commercial)

DNREC SITE-SPECIFIC STANDARD CALCULATOR FOR MULTIPLE ANALYTES May, 1999 Version										Calculated Cancer Risk			Calculated Noncancer Risk		
										Totals By Category			Totals By Category		
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Site Concentrations Table										Maximum In Each Category			Maximum In Each Category		
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
										0.00E+00	0.00E+00				

Table 11: Groundwater risk evaluation

Contaminant Name	CAS Number	Ground Water Concentration ug/L	Soil Concentration (Restricted Use) mg/kg	Soil Concentration (Unrestricted Use) mg/kg	Ground Water Ingestion Cancer Risk	Soil-Related Cancer Risk (Restricted Use)	Soil-Related Cancer Risk (Unrestricted Use)	Ground Water Ingestion Noncancer Risk	Soil-Related Noncancer Risk (Restricted Use)	Soil-Related Noncancer Risk (Unrestricted Use)
CYANOGEN CHLORIDE	506774									
HYDROGEN CYANIDE	74908									
POTASSIUM CYANIDE	151508									
POTASSIUM SILVER CYANIDE	506616									
SILVER CYANIDE	506649									
SODIUM CYANIDE	143339									
ZINC CYANIDE	557211									
<b>VOLATILE COMPOUNDS</b>										
**1,3-DICHLOROBENZENE	541731									
**ACETONE	67641									
**ACETONITRILE	75058									
**BROMOFORM	75252									
**CHLOROBENZENE	108907									
**CHLOROMETHANE	74873									
**DIMETHYLAMINE	124403									
1,1,1-TRICHLOROETHANE	71556									
1,1,2,2-TETRACHLOROETHANE	79345									
1,1,2-TRICHLOROETHANE	79005									
1,1-DICHLOROETHANE	75343									
1,2-DIBROMO-3-CHLOROPROPANE	96128									
1,2-DIBROMOETHANE	106934									
1,2-DICHLOROBENZENE	95501									
1,2-DICHLOROETHANE	107062									
1,2-DICHLOROPROPANE	78875									
1,3-DICHLOROPROPENE	542756									
1,4-DICHLOROBENZENE	106467									
2-HEXANONE	591786									
4-CHLOROANILINE	106478									
BENZENE	71432									
BIS(2-CHLOROISOPROPYL)ETHER	108601	97 000			3.73E-04					
BROMODICHLOROMETHANE	75274									